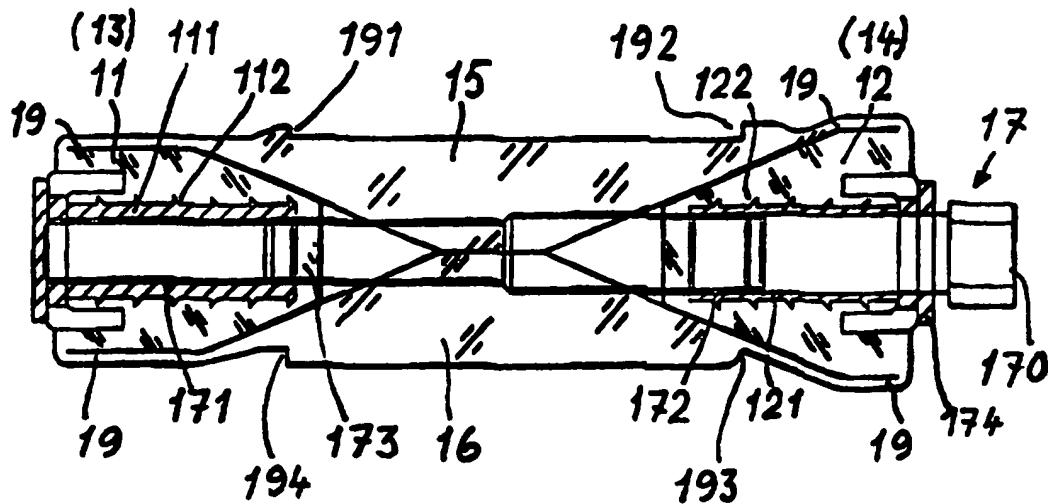




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(54) Title: A CABLE TRANSIT



(57) Abstract

A cable transit includes an outer frame (10), at least one module-based cable seal, and a final seal which fills-out the frame together with the cable seal. The final seal includes two compressible wedges (11, 12) which can be moved towards and away from each other by means of screw means (17), and two further compressible wedges (15, 16) which can also be moved towards and away from each other and which coact with the two first-mentioned wedges. The four wedges are held together by a movable strap (19) which holds the wedges so that they can move relative to one another, wherein the wedges and the screw means (17) together form a contained component which can be easily fitted into the frame. The outer side of the flexible strap (19) is provided with guide shoulders (191... 194) approximately opposite the further wedges (15, 16), for guiding the component to its correct position in the frame. The strap and the wedges are moulded in one piece, and one end (51) of the strap is glued to the other end (52) thereof.

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A CABLE TRANSIT**TECHNICAL FIELD**

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The present invention relates to a cable transit which includes an outer frame, at least one module-based cable seal, and a final sealing means which fills-out the frame together with the cable seal. The final sealing means includes two compressible wedges which can be moved towards and away from each other by means of screw means, and two further compressible wedges which can also be moved towards and away from one another and which coact with the two first-mentioned wedges.

10

DESCRIPTION OF THE BACKGROUND ART

Sealing systems which seal and protect cable and pipe transits against fire, smoke, gas, water, etc., are known to the art; see for instance Swedish Patent Specification 217276. This publication illustrates and describes a cable transit in which several separate cables are sealingly fitted and which comprises a rigid frame which includes resilient packing pieces which function to firmly clamp the cables, and a combination of wedges which when pushed together exert pressure on the packing pieces, and a tensioning device which functions to lock the wedge combination. These and other present-day sealing systems comprise several different loose components and several working steps are required to assembly, fit and dismantle such systems, which, when taken together, make the work more complicated and lower the speed at which the work can be carried out.

The object of the present invention is to eliminate these drawbacks.

SUMMARY OF THE INVENTION

The present invention provides a cable transit of the aforedescribed kind in which the four wedges are held together by a flexible strap which is adapted to hold the movable wedges firmly in relation to one another, so that the wedges and the screw means will form together a contained component which can be easily fitted in the frame.

10 BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in more detail with reference to the accompanying schematic drawings, in which

15 Fig. 1 illustrates a component prior to fitting the component in the frame (not compressed);

Fig. 2 shows the component compressed;

20 Fig. 3 shows the component in Fig. 1 from the rear;

Fig. 4 shows the component inserted in a frame; and

25 Fig. 5 shows the strap and wedges included in the component molded in one piece.

BEST MODES OF CARRYING OUT THE INVENTION

The component shown in Fig. 1 includes two compressible 30 wedges 11, 12, e.g. rubber wedges, which can be moved towards and away from each other by means of screw means 17, and two further compressible wedges 15, 16 which can also be moved towards and away from each other and which coact with the two first-mentioned wedges 11, 12.

35 The screw means 17 comprises two threaded sleeves 111 and 121 which are moulded in the wedges 11 and 12 respectively. The

wedges are drawn together by means of a long screw 173 having a right-hand and a left-hand thread 171 and 172 respectively.

5 The four wedges 11, 12, 15, 16 and the screw means 17 are held together by a flexible strap 19 to form an easily handled pack with the wedges together forming a contained component which can be easily fitted into a frame.

10 Fig. 2 shows the component shown in Fig. 1 after having been inserted into a frame, with all wedges being compressed as a result of tightening the screw means 17, whereby the wedge 15 presses against the frame (upwardly directed arrow) and the wedge 16 presses against an underlying cable seal (downwardly directed arrow) such as to obtain an effective
15 seal. The frame and cable seals are shown in Fig. 4.

20 In a further development of the invention, the component includes two pairs of juxtaposed wedges which can be moved with the aid of a respective screw means 17 and 18 for each wedge pair 11, 12 and 13, 14 respectively. In Fig. 1, the wedge 13 can be considered to lie behind the wedge 11 and the wedge 14 to lie behind the wedge 12. The further wedges 15, 16 are then extended (at right angles to the plane of the drawing) to enable coaction with the two wedge pairs 11, 12 and 13, 14 respectively. The strap 19 will now have twice the width of the earlier strap, so as to be able to hold the six wedges together.

25 The arrangement of a front (11) and a rear (13) wedge in the aforesaid manner instead of only a single long wedge on each side is effective in avoiding locking due to skewing of the wedges as they are compressed.

30 Fig. 2 clearly shows the "bends" that occur in parts of the strap 19 as a result of the smaller circumference of the component caused by its compression. The strap 19 holds the entire pack together in the form of a unit and will entrain

the upper wedge 15 and the lower wedge 16 when dismantling the pack.

Fig. 3 illustrates the screw means 17, 18, the common strap 19 and the two wedges 11 and 13. The arrangement includes a pressure distributing plate 37 beneath the screw means 17 and a corresponding pressure distributing plate 38 beneath the screw means 18, said plates functioning to distribute the pressure from the screw means uniformly over respective wedges. Unintentional disassembly of the arrangement is prevented by a stirrup-shaped locking device placed over the screw means.

Fig. 4 shows a frame 10 which includes a plurality of module-based cable seals 41, 42... 4n and a final seal (component) 40 at the top of the frame.

It will be evident from the foregoing that both compression and final sealing of the component are achieved quickly and in a simple fashion. The component is placed in its intended position in the frame as a unit and the two screws are tightened. No special tools are required for fitting or removing the component.

It is thought to be suitable to push the component into the frame on top of a support plate which covers the uppermost layer of modules in the frame. The two screws are tightened alternately, until the correct compression and tightness has been achieved.

As will be seen from Fig. 1, the screw means 17 includes two threaded sleeves 111, 121 for the wedges 11, 12 having a right-hand thread and a left-hand thread respectively, and a long screw 173 having a right-hand thread 171 and a left-hand thread 172 respectively, corresponding to the threads in the two sleeves. The thread located distal from the screw head 170 has a smaller diameter than the thread 172 which

lies proximal to the screw head 170.

As will be seen from Figs. 1 and 2, the outer surfaces of the sleeves 111, 121 are provided with grippers 112, 122.

5

The outer side of the flexible strap 19 is provided with guide shoulders 191... 194 approximately opposite the centre of the further wedges 15, 16, for guiding the component into its correct position in the frame 10.

10

It may be to advantage to mould the strap and the wedges in a one-piece structure, see Fig. 5, which from left to right shows the wedge 15, the strap 19, the wedge 12, the strap 19, the wedge 16, the strap 19, the wedge 11 and the strap 19.

15

The strap section 19 furthest to the right is provided with a shoulder 195 which fits into a recess 151 in the wedge 15. Upon completion of the moulding process, the ends are glued together with the shoulder 195 inserted in the recess 151.

20

The wedges are suitably lubricated with a Teflon® solution.

In order to prevent the screw 173 from being completely unscrewed from the rear sleeve 111 when removing the component, which if allowed to happen would mean that the sleeve 111 would be obliquely positioned relative to the sleeve 121 to a greater or lesser extent, a plate 174, see Fig. 1, is conveniently placed between the plate 37, see Fig. 3, and the screw head 170. The plate may be a "snap-on" plate and has a thickness such that when the plate engages the head 170, at least one turn of the screw thread will remain in the sleeve 111.

As before mentioned, no special tool is required for fitting/removing the component. However, it may sometimes be of assistance to have available a tool which comprises two screw tighteners which are joined together mechanically and which

- fit on the screw heads of the screw means 17, 18. When fitting the component, one of the screws is tightened with a spanner, wherewith the other screw will be tightened at the same time. This saves time and guarantees an even and appropriate pressure. This particularly applies when the tool includes a slide coupling which is effective in stopping tightening of the screws when a maximum predetermined pressure has been reached.
- 5
- 10 It will be noted that because of the particular way in which the wedges are held together, the strap 19 will assist in drawing together the upper wedge (15) and the lower wedge (16) when removing the component, therewith greatly facilitating handling.

CLAIMS

1. A cable transit which comprises an outer frame (10), at least one module-based cable seal and a final seal which
5 fills-out the frame together with the cable seal and which includes two compressible wedges (11, 12) which can be moved towards and away from each other by means of a screw means (17), and two further compressible wedges (15, 16) which can also be moved towards and away from each other and which
10 coact with the two first-mentioned wedges, characterized in that the four wedges (11, 12, 15, 16) are held together by a flexible strap (19) which functions to hold the wedges movably in relation to each other, such that the wedges and the screw means (17) together form a contained component
15 which can be fitted easily into the frame.

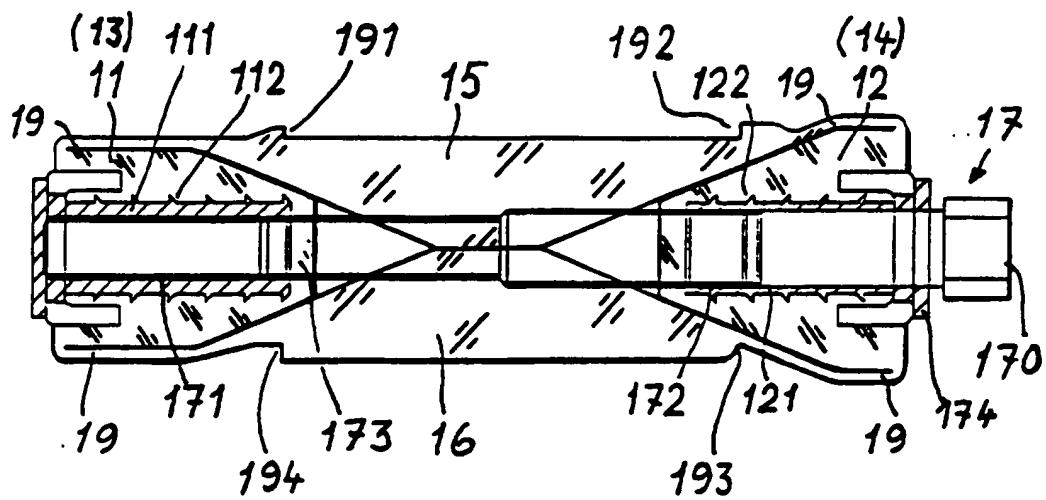
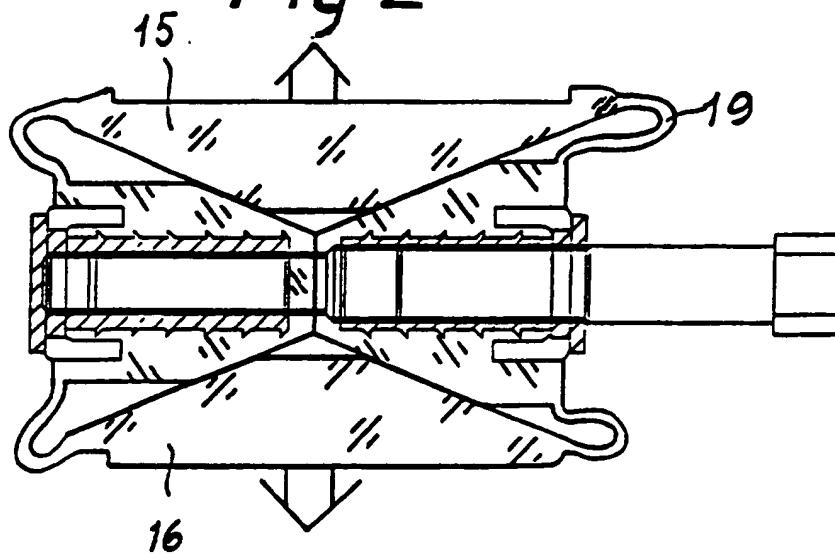
2. A cable transit according to Claim 1, characterized in that the component includes two pairs of juxtaposed wedges which can be moved by means of a screw means (17, 18) provided for each pair of wedges (11, 12; 13, 14); and in that the two further wedges (15, 16) are extended to enable coaction with the two wedge pairs (11, 12; 13, 14).

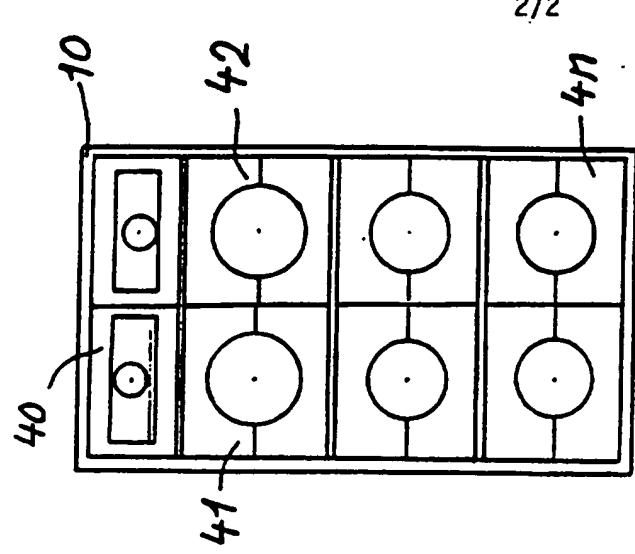
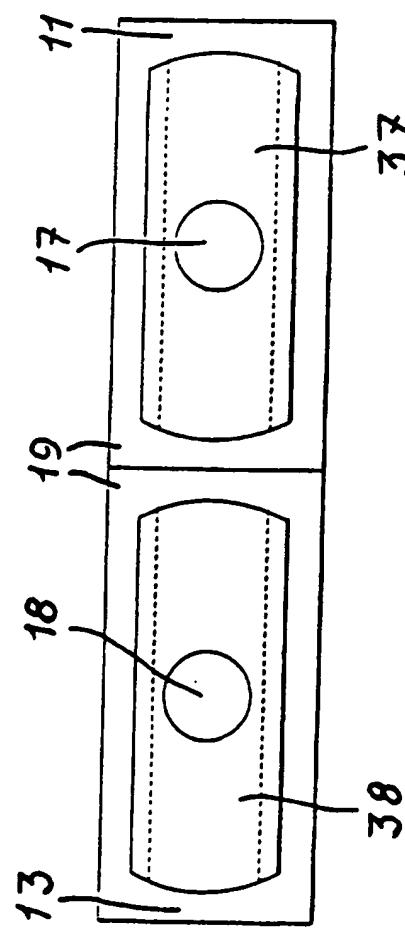
3. A cable transit according to Claim 1 or Claim 2, characterized in that the screw means (17) includes two threaded sleeves (111, 121) for the wedges (11, 12) having a right-hand thread and a left-hand thread respectively, and a long screw (173) having a right-hand thread (171) and a left-hand thread (172) corresponding to the respective threads of the
25 two sleeves, wherein the thread (171) located distal from the screw head (170) has a smaller diameter than the thread (172) located proximal to said screw head (170).

4. A cable transit according to Claim 3, characterized in that the sleeves (111, 121) are provided with grippers (112, 122) on their respective outer sides.

5. A cable transit according to any one of Claims 1-4, characterized in that the outer side of the flexible strap (19) is provided with guide shoulders (191... 194) approximately opposite the further wedges (15, 16), for guiding the component to its correct position in the frame (10).

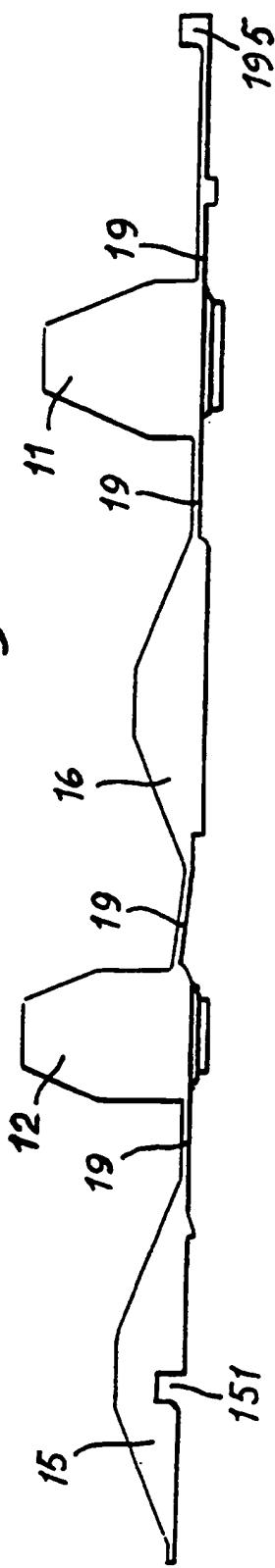
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Fig 2*Fig 1*



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Fig. 5



INTERNATIONAL SEARCH REPORT

International application No.

PCT/SE 95/01110

A. CLASSIFICATION OF SUBJECT MATTER

IPC6: F16L 5/08

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC6: F16L, H02G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE, DK, FI, NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SE 412820 B (WECKESSER COMPANY, INC.), 17 March 1980 (17.03.80), figure 2 --	
A	DE 2654806 A1 (NILS BRENDL), 15 June 1978 (15.06.78), figures 1,2 --	
A	DE 3828012 C2 (RUDOLF DÖPFL GESELLSCHAFT M.B.H.), 14 January 1993 (14.01.93), figure 3 -----	

 Further documents are listed in the continuation of Box C. See patent family annex.

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INTERNATIONAL SEARCH REPORT
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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
SE-B- 412820	17/03/80	NONE		
DE-A1- 2654806	15/06/78	NONE		
DE-C2- 3828012	14/01/93	AT-B- SE-A-	391044 8802897	10/08/90 10/03/89